

Application No.:09/681,186
Amendment dated: October 14, 2003
Reply to Office Action of July 14, 2003

c.) Remarks

Objections

All objections to the claims due to informalities were corrected as suggested by the Patent Office.

Rejections

Claims 1-15 are pending in the application. Claims 1 and 12 were amended.

The Patent Office rejected independent Claims 1 and 12 under 35 U.S.C. 103(a) over Thieme et al. (U.S. Patent 5,222,113, "Thieme"), in view of Levine et al ("Levine"), Nagai et al. (U.S. Patent 5,533,083, "Nagai"), and Iketaki (U.S. Patent 5,450,463, "Iketaki"). Applicant respectfully asserts that independent Claim 1 as amended is not obvious under 35 U.S.C. 103(a) for the following reasons.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the reference (or references when combined) must teach or suggest all the claim limitations¹. With regard to some suggestion or motivation to modify the reference or to combine reference teachings, as well as to a reasonable expectation of success, it has been well articulated that a factual inquiry whether to combine references must be based on objective evidence of record² and that teachings of references can be combined only if there is some suggestion or incentive to do so³.

The invention claimed in amended Claim 1 is a method of examining structures of an integrated circuit on a semiconductor substrate with a passivation layer over the structures to investigate electromigration in the structures. Examination of the structures without the passivation layer would result in an incorrect interpretation of electromigration in the structures. Moreover, as described in paragraphs 50 and 51 of the

¹ MPEP 2142-2143

² In re Lee, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002).

³ In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

Application No.:09/681,186
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specification and claimed in Claim 1, the change in contrast of the high contrast X-ray image is used to observe changes in the distribution of the material of which the structures are made. None of the publications cited by the Patent Office discloses or suggests using X-rays to examine the structures with a passivation layer in accordance with amended Claim 1. Similarly, none of the publications suggests examining the structures and observing electromigration in the passivated structures by observing the changes in the contrast of the high contrast X-ray image in accordance with the method claimed in amended Claim 1.

More specifically, Applicant asserts that the Iketaki patent is not even relevant to the claimed invention and cannot teach or suggest the claimed invention in any way. Iketaki relates to obtaining an X-ray image of a biological specimen. X-ray imaging of biological specimens has its own specific requirements due to the nature of the specimens and the danger of destroying biological matter, and it has nothing to do with imaging of integrated circuits on semiconductor wafers at harsher, shorter X-ray wavelengths. Because of the damage caused by short-wave X-rays to a biological specimen, the microscope in Iketaki uses softer X-rays between with the wavelength between 6.5 nm and 4.37 nm (Col. 9, last line). Also, Iketaki actually teaches away from the system used to practice the method of the present invention, saying that using "the X-ray optical elements such as zone plate and..." is "of little practical value" (Col. 2, lines 60-65). Therefore, no suggestion or motivation to combine Iketaki with Thieme or any other publication cited by the Patent Office could be found. Similarly, no reasonable expectation of success of X-ray examining structures of a semiconductor substrate as claimed in amended Claim 1, could be possibly found in Iketaki alone or in combination with another publication.

Similarly, neither Thieme, nor Levine nor Iketaki nor Nagai alone or combined teach or suggest or hint to an imaging X-ray microscope for "observing changes in distribution of a material of the structures corresponding to a change of contrast of the high contrast image" as claimed in amended independent Claim 1. Therefore, Applicant respectfully asserts that independent Claims 1 cannot be obvious over Thieme in view of Levine, Nagai, and Iketaki and are allowable.

Application No.: 09/681.186
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With regard to amended independent Claim 12, Applicant respectfully asserts that none of the references alone or combined teaches or suggests using an imaging X-ray microscope to observe changes in distribution of a material of the passivated structures of integrated circuits corresponding to a change of contrast of the high contrast image. The arguments presented in support of patentability of Claim 1 are herein repeated in their entirety. Amended independent Claim 12 is therefore allowable.

Claims 2-11 depend off independent Claim 1 and are allowable for the same reasons as presented above. Claims 13-15 depend off independent Claim 12 and is allowable for the same reasons. Allowance of the Claims is requested.

CONCLUSION

The Examiner is kindly invited to telephone the undersigned to resolve any questions to expedite the allowance of the pending Claims.

Applicants believe that the present application is in condition for allowance. A Notice of Allowance is respectfully solicited. Should any questions arise, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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